PLANT SOURCED PROTEIN-POLYPHENOL COMPLEXES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional application No. 63/094,050, filed October 20, 2020, entitled, "**PLANT SOURCED PROTEIN-POLYPHENOL COMPLEXES**," the disclosure of which is being incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to compositions useful as a precursor to meat substitute, specifically compositions made from pomace and one or more plant derived proteins, and to methods for making and methods for using such compositions.

SUMMARY ~~OF THE INVENTION~~

[0002a] In one aspect of the present disclosure, there is provided a composition comprising FVNG-pomace and one or more plant proteins, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w).

[0002b] In another aspect of the present disclosure, there is provided a composition comprising a complex of one or more plant proteins and FVNG-pomace phenolics, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100%.

[0002c] In a further aspect of the present disclosure, there is provided a meat analogue comprising FVNG-pomace and one or more plant proteins, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w).

[0002d] In another aspect of the present disclosure, there is provided a meat analogue comprising a complex of one or more plant proteins and FVNG-pomace phenolics, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100%.

[0002e] In a further aspect of the present disclosure, there is provided a method of making a composition comprising FVNG-pomace and one or more plant proteins, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w), comprising the steps of:

a. Optionally preparing one or more sources of plant protein;

b. Preparing FVNG-pomace;

c. Optionally fermenting the FVNG-pomace;

d. Combining one or more sources of protein with FVNG-pomace and/or fermented FVNG-pomace to generate protein-polyphenol complexes in either an Admixture or a Base Substance;

e. Optionally, conducting one or more Modification Steps to the Admixture or Base Substance; and

f. Optionally, formulating into a Meat Analogue.

[0002f] In another aspect of the present disclosure, there is provided amethod of making a composition comprising a complex of one or more plant proteins and FVNG-pomace phenolics, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100% comprising the steps of:

a. Optionally preparing one or more sources of plant protein;

b. Preparing FVNG-pomace;

c. Optionally fermenting the FVNG-pomace;

d. Combining one or more sources of protein with FVNG-pomace and/or fermented FVNG-pomace to generate protein-polyphenol complexes in either an Admixture or a Base Substance;

e. Optionally, conducting one or more Modification Steps to the Admixture or Base Substance; and

f. Optionally, formulating into a Meat Analogue.

[0002g] In a further aspect of the present disclosure, there is provided a method of using a composition comprising FVNG-pomace and one or more plant proteins, to modify the sensory qualities of a meat analogue, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w) to add to a Meat Analogue formulation to modify the sensory qualities thereof.

[0002h] In another aspect of the present disclosure, there is provided a method of using a composition comprising a complex of one or more plant proteins and FVNG-pomace phenolics to modify the sensory qualities of a meat analogue, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100%.

[0003] The composition and process described and ~~claimed~~disclosed herein have many attributes and ~~embodiment~~examples including, but not limited to, those set forth or described or referenced in this Summary ~~of the Invention~~. It is not intended to be all-inclusive and the ~~invention~~disclosure described and ~~claimed~~disclosed herein is not limited to or by the features or ~~embodiment~~examples identified in this Summary of the Invention, which is included for purposes of illustration only and not restriction.

[0004] A composition and method are provided, wherein one or more plant protein(s) are combined with one or more fruit, vegetable, nut or grain sources of phenolics to generate protein-phenol complexes within the mixture. The source of phenolics primarily derive from plant waste, residuals, by-products or side streams, such as, for example, the solids which remain after the extraction of juice from fruit or oil pressed from olives, nuts or grains (e.g., pomace), or fruit and vegetables, etc., which could not be sold for some reason or another. In one ~~embodiment~~example, the one or more sources of phenolics comprise, consist essentially of, or consist of

pomace, wine derivatives (pomace, with or without lees). In one ~~embodiment~~example, this mixture constitutes an Admixture that can be added to meat analogue formulations to provide a Base Substance or a Meat Analogue and/or Final Product. In one ~~embodiment~~example, this mixture provides a Base Substance, which is then modified in one or more steps in order to create a Meat Analogue and/or a Final Product. The Meat Analogue and/or Final Product can provide a replacement for different types of meat including beef, buffalo, deer, chicken, turkey, pork, fish, shellfish, etc.

[0005] The present ~~invention~~disclosure provides a composition comprising FVNG-pomace and one or more plant proteins. Optionally, the FVNG-pomace is a fermented PVNG-pomace that has been fermented prior to combining with one or more plant proteins.

[0006] In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 50% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins consists of about 50% to 100% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins consists of about 100% to 150% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins consists of about 150% to 200% (dry w/w). Furthermore, in one ~~embodiment~~example, the composition, which can be an Admixture and/or a Base Substance, additionally comprises one or more of exogenous: starches; fats or oils; carbohydrate; gums; hydrocolloids; acidulants; stabilizers; emulsifiers; flavor precursors; protein-fiber binding agents; lactones; colorings; plant-based fibers; fungal mycelium; antioxidants; and phenolics, which may be formulated into a Meat Analogue.

[0007] In one ~~embodiment~~example, the composition comprises a complex of one or more plant proteins and FVNG-pomace phenolics, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100%. In one ~~embodiment~~example, the percentage of plant proteins that are complexed with phenolics is about 5% to 20%. In one ~~embodiment~~example, the percentage of plant proteins that are complexed with phenolics is about 20% to 40%. In one ~~embodiment~~example, the percentage of plant proteins that are complexed with phenolics is about 40% to 60%. In one ~~embodiment~~example, the percentage of plant proteins that are complexed with phenolics is

about 60% to 80%. In one ~~embodiment~~example, the percentage of plant proteins that are complexed with phenolics is about 80% to 100%. Furthermore, in one ~~embodiment~~example, the composition, which can be an Admixture and/or a Base Substance, additionally comprises one or more of exogenous: starches; fats or oils; carbohydrate; gums; hydrocolloids; acidulants; stabilizers; emulsifiers; flavor precursors; protein-fiber binding agents; lactones; colorings; plant-based fibers; fungal mycelium; antioxidants; and phenolics, which may be formulated into a Meat Analogue.

[0008] The present ~~invention~~disclosure further provides a meat analogue comprising FVNG-pomace and one or more plant proteins, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins in the Meat Analogue consists of about 5% to 50% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins in the Meat Analogue consists of about 50% to 100% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins in the Meat Analogue consists of about 100% to 150% (dry w/w). In one ~~embodiment~~example, the ratio of FVNG-pomace to the one or more plant proteins in the Meat Analogue consists of about 150% to 200% (dry w/w). In one option, the Meat Analogue may be processed by a texturizing means, including but not limited to: extrusion; laminating; 3D food printing.

[0009] The present ~~invention~~disclosure further provides a Meat Analogue comprising a complex of one or more plant proteins and FVNG-pomace phenolics, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100%. In one ~~embodiment~~example, the percentage of plant proteins in the Meat Analogue that are complexed with phenolics is about 5% to 20%. In one ~~embodiment~~example, the percentage of plant proteins in the Meat Analogue that are complexed with phenolics is about 20% to 40%. In one ~~embodiment~~example, the percentage of plant proteins in the Meat Analogue that are complexed with phenolics is about 40% to 60%. In one ~~embodiment~~example, the percentage of plant proteins in the Meat Analogue that are complexed with phenolics is about 60% to 80%. In one ~~embodiment~~example, the percentage of plant proteins in the Meat Analogue that are complexed with phenolics is about 80% to 100%. In one option, the Meat Analogue may be processed by a texturizing means, including but not limited to: extrusion; laminating; 3D food printing.

[0010] The ~~invention~~disclosure further provides a method of making a composition comprising FVNG-pomace and one or more plant proteins, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w), comprising the steps of: optionally preparing one or more sources of plant protein; preparing FVNG-pomace; optionally fermenting the FVNG-pomace; combining one or more sources of protein with FVNG-pomace and/or fermented FVNG-pomace to generate protein-polyphenol complexes in either an Admixture or a Base Substance; optionally, conducting one or more Modification Steps to the Admixture or Base Substance; and optionally, formulating into a Meat Analogue.

[0011] The ~~invention~~disclosure further provides a method of making a composition comprising a complex of one or more plant proteins and FVNG-pomace phenolics, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100% comprising the steps of: optionally preparing one or more sources of plant protein; preparing FVNG-pomace; optionally fermenting the FVNG-pomace; combining one or more sources of protein with FVNG-pomace and/or fermented FVNG-pomace to generate protein-polyphenol complexes in either an Admixture or a Base Substance; optionally, conducting one or more Modification Steps to the Admixture or Base Substance; and optionally, formulating into a Meat Analogue.

[0012] The ~~invention~~disclosure further provides a method of using a composition comprising FVNG-pomace and one or more plant proteins, to modify the sensory qualities of a meat analogue, wherein the ratio of FVNG-pomace to the one or more plant proteins consists of about 5% to 200% (dry w/w) to add to a Meat Analogue formulation to modify the sensory qualities thereof.

[0013] The ~~invention~~disclosure further provides a method of using a composition comprising a complex of one or more plant proteins and FVNG-pomace phenolics to modify the sensory qualities of a meat analogue, wherein the percentage of plant proteins that are complexed with phenolics is about 5% to 100%.